

A Prospective Study of Prevalence of Gallstones among Pregnant Women in a Tertiary Care Hospital

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Abstract

Introduction: Gallstone disease is more common in women than men. Pregnancy is a known risk factor for developing gallstones. Both the frequency and number of pregnancies are major risk factors for cholesterol gallstones. New biliary sludge (A precursor to gallstones) and gallstones may form in pregnant women. Gallstones are easily detected with ultrasound. Pregnant women routinely undergo obstetric ultrasound. This study was carried out to find prevalence of gallstone in pregnant women by additional upper abdominal ultrasound screening during routine antenatal ultrasound.

Materials and Methods: 600 consecutive pregnant women with gestational age up to 25 weeks (Gestational age as per biometry) who were referred for routine obstetric ultrasound between January 2019 to December 2019 at Rajendra Institute of Medical Sciences, Ranchi. It is a retrospective study. Ultrasonography referral forms, ultrasound images and ultrasound reports were assessed retrospectively. If a pregnant woman had come for more than one ultrasound within the study period, she was counted as single patient.

Results: There were 600 pregnant women with gestational age up to 25 weeks. Among the 131 women in first trimester, there were 7 cases of ectopic gestations and one with molar pregnancy. Among the 469 women with gestational age of 13 weeks and above, there were 3 women with intrauterine fetal death.

Conclusion: Prevalence of either gallstones or biliary sludge in pregnant women (with gestational age up to 25 weeks) is 4% in our region. Prevalence of gallstones increased with increasing parity.

Key Words: Gallstones, ectopic gestations, Ultrasonography.

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I. Introduction

Gallstone disease is more common in women than men. Pregnancy is a known risk factor for developing gallstones. Both the frequency and number of pregnancies are major risk factors for cholesterol gallstones. New biliary sludge (A precursor to gallstones) and gallstones may form in pregnant women. Gallstones are easily detected with ultrasound.² Pregnant women routinely undergo obstetric ultrasound. This study was carried out to find prevalence of gallstone in pregnant women by additional upper abdominal ultrasound screening during routine antenatal ultrasound.³

Gallbladder disease is one of the most common causes of hospital admission in middle-aged patients in developed countries (Kang et al., 2003 and Kratzer et al., 1999) resulting in a substantial cost to health systems (Aerts and Penninckx, 2003).⁴ Various numbers of factors including high age, female sex, over-weight, food pattern, and a sedentary lifestyle have been identified to be associated with a higher risk of gallstones (Volzke et al., 2005 and Shaffer, 2006).⁵

Women are 1.5-3 times more frequently affected by gallstones than men. Pregnancies might be the main factor, but also the use of oral contraceptives (OCs) or menopausal hormone therapy (MHT) might play a role (Uhler et al., 2000; Thijs and Knipschild, 1993 and Dhiman and Chawla, 2006).⁶ In 31% of pregnant women occurs biliary sludge (Marinighini et al., 1993), which is a potential mediator of gallstone formation.⁷ Moreover, use of OC and MHT causes an increase of cholesterol secretion, which promotes gallstone formation via cholesterol supersaturation of bile (Mandez-Sanchez et al., 2007). Supersaturated bile and increased hepatic secretion of cholesterol also possibly link to obesity and gallstones.⁸

A further determinate of gallstone formation is diet. A high intake of saturated fat and carbohydrates as well as a high glycemic load and index is associated with an increased gallstones rate, whereas a high fat protects against gall stone disease (Katsika et al., 2005).

II. Materials And Methods

Ultrasonography of abdomen and pelvis was performed with Hitachi Aloka Arietta S60 (Tokyo, Japan) machine with 1-5 MHz convex probe, 3-7 MHz linear probe and 2-10 MHz Transvaginal probe. 1-5 MHz convex probe was used for screening of gall bladder. Single radiologist with over 12 years of experience in ultrasound performed all the ultrasound examinations.

Study Sample

600 consecutive pregnant women with gestational age upto 25 weeks (Gestational age as per biometry) who were referred for routine obstetric ultrasound between January 2019 to December 2019 at Rajendra Institute of Medical Sciences, Ranchi. It is a retrospective study. Ultrasonography referral forms, ultrasound images and ultrasound reports were assessed retrospectively. If a pregnant woman had come for more than one ultrasound within the study period, she was counted as single patient.

Definition of Terms

Biliary sludge is defined as echogenic mobile debris layering dependently in the gallbladder without posterior acoustic shadowing. Microlithiasis is defined as small calculi that are less than 3 mm in size. In this study we included microlithiasis in the biliary sludge category. Gallstones are echogenic material (High amplitude echoes) that measure 3 mm or more; gallstones usually cast acoustic shadowing. Small stones (Less than 5 mm) may not cast acoustic shadowing¹ but will still appear echogenic; mobility differentiates gallstones from polyps.¹ Examples of biliary sludge, microlithiasis and gallstones are demonstrated in the following figures (Figure 1a, Figure 1b and Figure 2) from our study sample.

Inclusion Criteria

Pregnant women (Belonging to any age group and any parity) with gestational age upto 25 weeks (Gestational age as per biometry). Screening ultrasound of upper abdomen was not performed in pregnant women with gestational age of 26 weeks and above and so they were not included in the study. Twin pregnancies were also included in the study sample. Ectopic gestations and intrauterine fetal deaths were also included in the study sample.

Exclusion Criteria

History of cholecystectomy. During the study period, there was mention of history of cholecystectomy in ultrasound reports of two pregnant women, who were excluded. Those with missed abortion or complete abortions (During study period) were not included in the study.

Statistical Analysis

Among 600 pregnant women, 24 were found to have either gallstone or biliary sludge.

Sample size (Number of pregnant women) = 600

Number of positive (Pregnant women with either gallstone or sludge) = 24

Confidence interval: 95%

Confidence interval method: Clopper-Pearson exact (Binomial proportion confidence interval)

Proportion/ prevalence = 0.0400 (4.0%)

Lower 95% confidence limit is 0.0258 (2.6%)

Upper 95% confidence limit is 0.0589 (5.9%)

Proportion of pregnant women with either gallstone or biliary sludge is 4.0%, 95% confidence interval = 2.6% to 5.9%

Proportion of primigravida with either gallstone or biliary sludge is 3.4%, 95% confidence interval = 1.7% to 6.0%

Proportion of multigravida with either gallstone or biliary sludge is 4.7%, 95% confidence interval = 2.5% to 7.9%

III. Results

There were 600 pregnant women with gestational age up to 25 weeks. Among the 131 women in first trimester, there were 7 cases of ectopic gestations and one with molar pregnancy. Among the 469 women with gestational age of 13 weeks and above, there were 3 women with intrauterine fetal death.

S.No	Maternal age in years	Number of all Pregnant Women (without or with Gallstone or Sludge)	Number of Pregnant Women with Gallstone	Number of Pregnant Women with Biliary Sludge	Number of Pregnant Women with either Gallstone or Sludge
1	18-20	106	0	0	0
2	21-25	268	9	6	15
3	26-30	159	6	1	7
4	31-35	56	1	1	2
5	36-40	10	0	0	0
6	41-45	1	0	0	0
7	Total	600	16	8	24

Table 1: Age Distribution

S.No	Gravida	Number of all Pregnant Women (without or with Gallstone or Sludge)	Number of Pregnant Women with Gallstone	Number of Pregnant Women with Biliary Sludge	Number of Pregnant Women with either Gallstone or Sludge
1	Primigravida	324	6	5	11
2	Multigravida	276	10	3	13
3	Total	600	16	8	24

Table 2: Gravida Distribution

S.No	Gestational age	Number of all Pregnant Women (without or with Gallstone or Sludge)	Number of Pregnant Women with Gallstone	Number of Pregnant Women with Biliary Sludge	Number of Pregnant Women with either Gallstone or Sludge
1	≤12 weeks	131	3	2	5
2	13-25 weeks	469	13	6	19

Table 3: Gestational age

S.No	Type of Pregnancy	Number of all Pregnant Women (without or with Gallstone or Sludge)	Number of Pregnant Women with Gallstone	Number of Pregnant Women with Biliary Sludge	Number of Pregnant Women with either Gallstone or Sludge
1	Singleton	578	15	8	23
2	Twin Pregnancy	11	1	0	1

Table 4: Type of pregnancy

Chronic calcific pancreatitis	2
Portal cavernoma	1

Table 5: Incidentally Detected other Hepatobiliary/ Pancreatic Diseases in These Pregnant Women during Upper Abdominal Ultrasound Screening



Figure 1: Showing Biliary Sludge as Layering Echogenic Material in Gallbladder without Shadowing

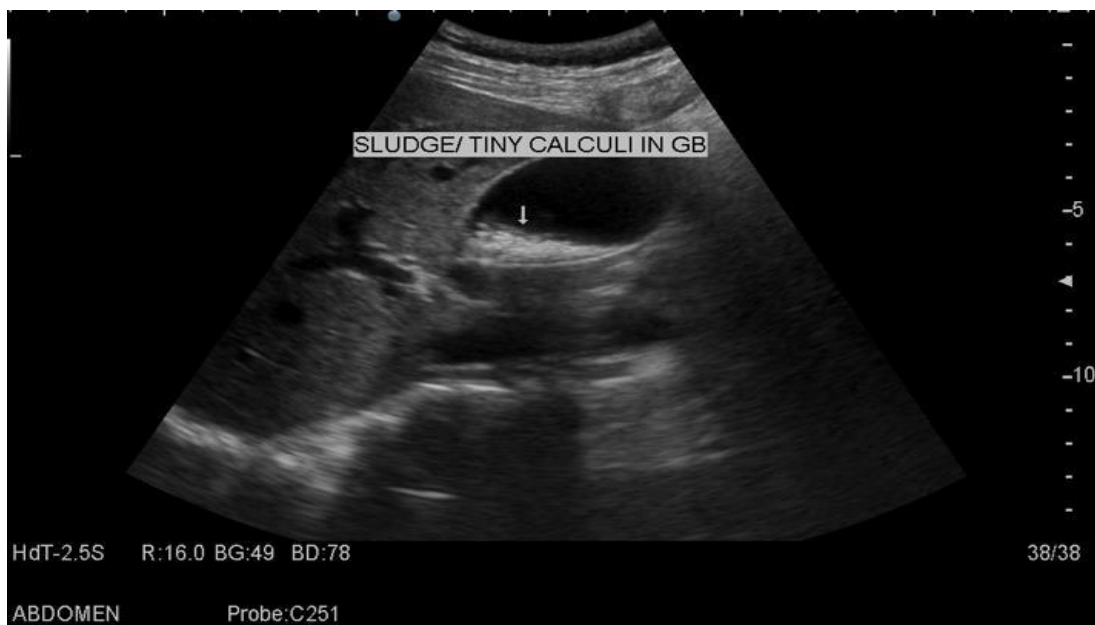


Figure 2: Showing Biliary Sludge/Microlithiasis (Same Patient as in Figure 1a, but After 10 Weeks). We can Appreciate Faint Shadowing in Figure 1b. Sludge has Become Microlithiasis in 10 Weeks' Time

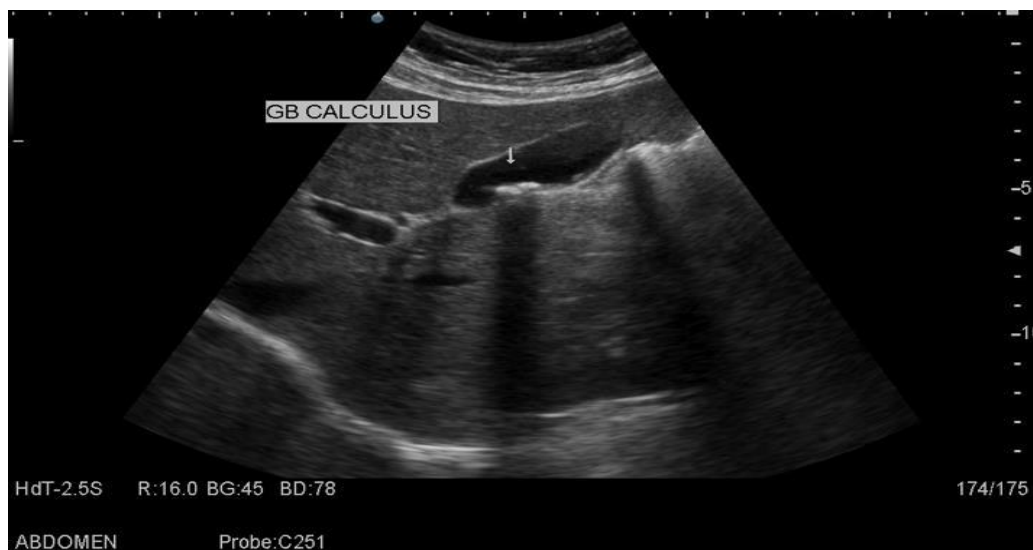


Figure 3: Showing Cholelithiasis. Two Calculi in The Lumen of Gallbladder with Posterior Acoustic Shadowing

IV. Discussion

In our study we found 24 (4%) cases of gallstones/ biliary sludge (either gallstones or biliary sludge) in 600 pregnant women with gestational age up to 25 weeks. There were 16 cases (2.7%) of gallstones and 8 cases (1.3%) of biliary sludge.

Among 324 primigravida, 11 (3.4 % of primigravida, 1 in 29 primigravida) had gallstones/ biliary sludge (either gallstones or biliary sludge). Among 276 multigravidas, 13 (5% of multigravida, 1 in 21 multigravida) had gallstones/ biliary sludge. The prevalence of gallstones/ biliary sludge is more among multigravida than primigravida.⁹

Among 131 women with first trimester pregnancy, 5 (3.8%) had gallstones/ biliary sludge. Among 469 women with gestational age between 13-25 weeks, 19 (4.0%) had gallstones/ biliary sludge.

106 women were 18-20 years old of which none had gallstones/ biliary sludge. 427 women were 21-30 years old of which 22 (5.1%) had gallstones/ biliary sludge. 61 women were 31 years or older of which two (3.3%) had gallstones/ biliary sludge.

578 pregnant women had single live intrauterine pregnancy. Among them, 23 had gallstone/ biliary sludge (4%). 11 pregnant women had twin pregnancy among which one had gallstone (9%).¹⁰

In a previous study done by Richa Gangwar et al, the incidence of biliary sludge and gallbladder stones during pregnancy was found to be 14.4% and 6.67% respectively. In our study prevalence of sludge and gallstone is 1.3% and 2.7% respectively. The cause for lesser prevalence in our study could not be explained. One possibility is that this is due to variation in study population, with differences in BMI. Ethnic difference could be one among the causes for reduced prevalence of gallstone in our study population.¹¹

V. Conclusion

Prevalence of either gallstones or biliary sludge in pregnant women (with gestational age upto 25 weeks) is 4% in our region. Prevalence of gallstones increased with increasing parity.

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